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The time period for reply, if any, is set in the attached communication.



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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/560,804  
Filing Date: December 15, 2005  
Appellant(s): HAIDAR, JAWAD

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Eric D. Babych  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed August 2<sup>nd</sup>, 2010 appealing from the Office action mailed January 5, 2010.

**(1) Real Party in Interest**

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

Claims 1-7, 11-26, 31, 32, 36-40, 45, 52-55 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nie et al. (US Pub, 2004/0050208 A1).

Claims 8-10 and are rejected under 35 U.S.C. 103(a) as being unpatentable over Nie et al. ('208 A1) in view of O'Donnell et al. (US 5,397,375)

**(4) Status of Amendments After Final**

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

**(5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter contained in the brief.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being

maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

#### **(7) Claims Appendix**

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

#### **(8) Evidence Relied Upon**

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

US Pub, 2004/0050208 A1	Nie et al.	March 18, 2004
US 5,397,375	O'Donnell et al.	March 14, 1995

#### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1-7, 11-26, 31, 32, 36-40, 45, 52-55 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nie et al. (US Pub, 2004/0050208 A1).

With respect to claims 1 and 31, Nie et al. ('208 A1) discloses a method to produce titanium-aluminum compounds comprising (paragraphs [0025]-[0096]) a first step of reducing an amount of titanium chloride ( $\text{TiCl}_4$ ) with an amount of aluminum to trigger first reaction at temperature of less than  $130^\circ\text{C}$  to greater than  $660^\circ\text{C}$  to form Ti powder, aluminum chloride ( $\text{AlCl}_3$ ) in solid or vapor form, unreacted  $\text{TiCl}_4$  and first reaction products that will need to be treated or further processed (e.g. titanium subchlorides as claimed) (paragraphs [0044] and [0059]); and then a second step of

mixing the products of the first step and Al and heating the mixture in a reaction zone to a temperature above 660 °C (e.g. 700 °C) (paragraph [0072]) to produce in the reaction zone of the titanium-aluminum compounds and/or titanium-aluminum alloys. Nie et al. ('208 A1) does not specify the titanium subchlorides as claimed. However, the first reaction products that will need to be treated or further processed as disclosed by Nie et al. ('208 A1) read on the claimed titanium subchlorides because of the similarities of the reactants and the process conditions between the instant invention and Nie et al. ('208 A1). The temperatures of the first and second steps overlap the claimed temperature ranges respectively, and therefore a prima facie case of obviousness exists. See MPEP 2144.05 I.

With respect to claims 2, 3 and 32, Nie et al. ('208 A1) discloses that the chloride of the reducing agent is constantly removed from the reaction zone as claimed (paragraph [0081]).

With respect to claims 4, 52, 5 and 53, Nie et al. ('208 A1) discloses the first step is conducted in a temperature range of less than 130 °C to greater than 660 °C (paragraph [0059]), which overlaps the claimed ranges.

With respect to claims 6 and 54, Nie et al. ('208 A1) discloses the first step is conducted with an excess amount of the reducing metal (paragraph [0038]).

With respect to claims 7 and 55, Nie et al. ('208 A1) discloses the second step is conducted in a temperature range of up to greater than 660 °C (paragraph [0072]), which overlaps the claimed ranges.

With respect to claims 11-13, Nie et al. ('208 A1) discloses condensing  $\text{AlCl}_3$ , the unreacted  $\text{TiCl}_4$  and first reaction products that will need to be treated or further processed away from the reaction zone at a temperature lower than that in the reaction zone; and returning the condensed titanium chlorides to the reaction zone (paragraph [0058]).

With respect to claims 14-21 and 36-40, Nie et al. ('208 A1) discloses ejecting a source of one or more elements selected from aluminum, vanadium, chromium, niobium and zirconium into the reaction zone to form intermetallic compounds as desired (paragraphs [0030], [0070] and [0072]).

With respect to claims 22-24, Nie et al. ('208 A1) discloses that the Al powder has a diameter of 7-15  $\mu\text{m}$  (paragraph [0095]), which overlaps the ranges of less than 50  $\mu\text{m}$  as claimed in the instant claims 22 and 24. The claimed features in the instant claim 23 would be obvious to one of ordinary skill in the art if the Al particles have a diameter greater than 50  $\mu\text{m}$ , because milling has been commonly used to reduce the size of particles.

With respect to claim 25, Nie et al. ('208 A1) discloses the method is conducted in an inert gas atmosphere (paragraph [0080]).

With respect to claim 26, Nie et al. ('208 A1) discloses that the titanium-aluminum intermetallic compounds produced include  $\text{Al}_x\text{Ti}_y$  (paragraphs [0095] and [0096]), which reads on the claimed intermetallic compounds.

With respect to claims 45 and 62, they are product-by-process claims. Even through product-by-process claims are limited by and defined by the process,

determination of patentability is based on the product itself. In the instant case, Nie et al. ('208 A1) discloses metal compounds (paragraphs [0025]-[0096]), which reasonably appear to be only slightly different than the respective claimed products in the product-by-process claims as stated above. A rejection based on section 103 of the status is therefore eminently fair and acceptable. See MPEP 2113.

2. Claims 8-10 and are rejected under 35 U.S.C. 103(a) as being unpatentable over Nie et al. ('208 A1) as applied to claim 1 above and further in view of O'Donnell et al. (US 5,397,375).

With respect to claims 8-10, Nie et al. ('208 A1) does not disclose the claimed features. O'Donnell et al. ('375) discloses using metal fluoride to reduce metal oxide to produce titanium fluoride ( $\text{TiF}_4$ ) (col. 3, lines 44-56), which reads on the claimed features. It would have been obvious to one of ordinary skill in the art at the time the invention was made to reduce titanium oxide by using aluminum chloride to produce  $\text{TiF}_4$  and aluminum oxide and electrolyze the aluminum oxide to produce aluminum raw material in the process of Nie et al. ('208 A1) in order to recycle the aluminum chloride as disclosed by O'Donnell et al. ('375) (col. 3, lines 44-56).

#### **(10) Response to Argument**

The appellant's arguments in the Appeal Brief filed on March 26, 2010 have been fully considered but they are not persuasive.

First, the appellant argues that Nie et al. ('208 A1) solely discloses a one-step reduction process, in which the precursor material(s) is directly reduced to an elemental or alloy material. In response, the examiner notes that Nie et al. ('208 A1) discloses that

due to the limitations of most operating conditions, there may be some amount of unreacted precursor materials and first reaction products that will need to be treated or further processed and recovered unreacted reductants may be used to treat these or additional first reaction products (paragraph [0044], clearly suggesting performing a stepwise reduction as instantly claimed.

Second, the appellant argues that when read as a whole, Nie et al. ('208 A1) clearly teaches away from using Al as a reductant and throughout Nie et al. ('208 A1);  $\text{TiCl}_4$  is only ever described as being reduced using a reducing gas. In response, the examiner notes that Nie et al. ('208 A1) clearly discloses that  $\text{TiCl}_4$  may be reduced to Ti through the use of reducing agents such as hydrogen and aluminum (paragraphs [0004], [0059] and [0063]). The rejection was based on the prior art's broad disclosure rather than preferred embodiments. See MPEP 2123. The statement of Nie et al. ('208 A1) that reducing  $\text{TiCl}_4$  solely by a metal would require separating the produced Ti product from the original reductant metal and reductant-halide (paragraph [0066]) is just a statement of truth and does not constitute a teaching away. Furthermore, it is well held that mere disclosure of alternative designs does not teach away. See *In re Fulton*, 391 F. 3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004). In the instant case, that Nie et al. ('208 A1) prefers using hydrogen gas to reduce  $\text{TiCl}_4$  because it is clean, abundant and relatively inexpensive (paragraph [0034]) is simply an alternative design for using aluminum for the reduction.

Third, the appellant argues that Nie et al. ('208 A1) does not teach the existence of Ti subchloride intermediates, let alone teach that these intermediates could be further



reduced in a stepwise process with aluminum. In response, the examiner notes that Nie et al. ('208 A1) does not specify the titanium subchlorides as claimed. However, the first reaction products that will need to be treated or further processed as disclosed by Nie et al. ('208 A1) read on the claimed titanium subchlorides because of the similarities of the reactants and the process conditions between the instant invention and Nie et al. ('208 A1). Nie et al. ('208 A1) further discloses that due to the limitations of most operating conditions, there may be some amount of unreacted precursor materials and first reaction products that will need to be treated or further processed and recovered unreacted reductants may be used to treat these or additional first reaction products (paragraph [0044], clearly suggesting performing a stepwise reduction as instantly claimed.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Weiping Zhu/

Weiping Zhu

Patent Examiner, Art Unit 1734

Art Unit: 1734

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